

## CLAIMS

1. A display unit having a coherent light scanning system for scanning coherent light, and projecting the coherent light onto a screen using the coherent light scanning system, said coherent light scanning system comprising:

    a polygon mirror for reflecting the coherent light so that scanning on the screen is carried out by its rotation; and

    an optical path formation part for forming an optical path of the coherent light to reach the screen so that plural scannings are carried out on the screen by the coherent light that is reflected at one reflection plane of the polygon mirror.

2. A display unit as defined in Claim 1 wherein said optical path formation part changes the scanning direction due to the coherent light, which is determined in accordance with the rotation direction of the polygon mirror.

3. A display unit as defined in Claim 2 wherein said optical path formation part comprises a reflection mirror which is disposed on a path of reflected light from the polygon mirror, and reflects the coherent light from the polygon mirror.

4. A display unit as defined in Claim 3 wherein said reflection mirror is disposed in a position at which the reflection mirror

reflects the coherent light from the polygon mirror while the rotation angle of the polygon mirror is within a predetermined range.

5. A display unit as defined in Claim 4 wherein a plurality of said reflection mirrors are disposed.

6. A display unit as defined in Claim 5 wherein said plural reflection mirrors are two mirrors which are disposed with reflection surfaces thereof being opposed to each other; and

    said two reflection mirrors are disposed so that the coherent light reflected at each of the two reflection mirrors and the coherent light that passes through a space between the two reflection mirrors scan the same range on the screen.

7. A display unit as defined in Claim 6 wherein said reflection mirrors multiple-reflect the coherent light.

8. A display unit as defined in Claim 6 wherein said two reflection mirrors are disposed rotatably about an axis that is perpendicular to the scanning direction of the coherent light.

9. A display unit as defined in Claim 1 wherein said optical path formation part has a high-speed deflector for deflecting a

single beam of coherent light applied to one reflection plane of the polygon mirror to generate plural beams, and outputting the plural beams to the polygon mirror.

10. A display unit as defined in Claim 9 wherein said high-speed deflector comprises an EO (Electro Optical) deflection device.

11. A display unit as defined in Claim 9 wherein said high-speed deflector deflects the coherent light along the direction that is approximately perpendicular to the scanning direction of the polygon mirror.

12. A display unit as defined in Claim 1 wherein said optical path formation part includes a free-form surface mirror which is disposed on a path of reflected light from the polygon mirror, and has at least one reflection plane of free-form surface shape.

13. A display unit as defined in Claim 12 wherein said free-form surface mirror has two or more reflection planes.

14. A display unit as defined in Claim 13 wherein said reflection planes include first and third reflection planes of free-form surface shapes, and a second reflection plane of planar shape, which is sandwiched between the first and third reflection planes.

15. A display unit as defined in Claim 14 wherein said first to third reflection planes are shaped such that the respective coherent light beams applied to the first to third reflection planes scan the same range on the screen.

16. A display unit having a coherent light scanning system for scanning coherent light, and projecting the coherent light onto a screen using the coherent light scanning system, wherein said coherent light scanning system comprises:

    a polygon mirror for scanning the coherent light toward its rotation direction, and

    an optical path formation part for increasing the scanning line number of the coherent light; and

    said optical path formation unit comprises:

        a high-speed deflector for deflecting a single beam of coherent light to generate plural beams, and outputting the plural beams to the polygon mirror, and

        a reflection mirror which is disposed on a path of reflected light from the polygon mirror, and reflects the plural coherent lights from the polygon mirror.

17. A display unit having a coherent light scanning system for scanning coherent light, and projecting the coherent light onto a

screen using the coherent light scanning system, wherein  
said scanning system comprises:

    a polygon mirror for scanning the coherent light toward  
    its rotation direction, and

    an optical path formation part for increasing the  
    scanning line number of the coherent light; and

    said optical path formation part comprises:

        a high-speed deflector for deflecting a single beam of  
        coherent light to generate plural beams, and outputting the  
        plural beams to the polygon mirror, and

        a free-form surface mirror which is disposed on a path of  
        reflected light from the polygon mirror, and includes at least  
        one reflection plane of free-form surface shape.

18. A coherent light scanning method for performing scanning  
with coherent light on a screen, comprising:

    rotating a polygon mirror which reflects the coherent light,  
    so that scanning is carried out on the screen by the coherent  
    light reflected at the polygon mirror; and

    forming an optical path of the coherent light to reach the  
    screen so that plural scannings are carried out on the screen by  
    the coherent light reflected at one reflection plane of the  
    polygon mirror.

19. A coherent light scanning method for performing scanning

with coherent light on a screen, comprising:

rotating a polygon mirror which reflects the coherent light, so that scanning is carried out on the screen by the coherent light reflected at the polygon mirror; and

reflecting the coherent light that is reflected at one reflection plane of the polygon mirror by at least one mirror which is disposed on a path of reflected light from the polygon mirror up to the screen so that plural scannings are carried out on the screen by the coherent lights.

20. A coherent light scanning method for performing scanning with coherent light on a screen, comprising:

deflecting a single coherent light in a direction that is approximately perpendicular to the scanning direction of a polygon mirror, thereby to generate plural beams; and

rotating the polygon mirror that reflects the plural coherent lights so that plural scannings are carried out on the screen by the plural coherent lights reflected at the polygon mirror.

21. A coherent light scanning method for performing scanning with coherent light on a screen, comprising:

rotating a polygon mirror that reflects the coherent light, so that scanning is carried out on the screen by the coherent light reflected at the polygon mirror; and

reflecting the coherent light that is reflected at one

reflection plane of the polygon mirror, so that plural scannings are carried out on the screen by the coherent light, by a free-form surface mirror having a free-form surface shape, which is disposed on a path of reflected light from the polygon mirror to reach the screen.